

Notes on the species of *Dendroctonus* of Boreal America.

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A study of my material of this genus, chiefly undertaken for the purpose of placing some doubtful forms, has led to the discovery of characters definite and easily recognizable, which thus far have been overlooked. Further investigation, covering all the material and representing all the species hitherto recognized, contained in the collections of Dr. Horn, Mr. H. Ulke and Dr. J. Hamilton, has confirmed these and made the separation and identification of the species at once positive and easy of attainment. The anterior margin of the rostrum, which for convenience, I shall here designate as epistoma presents each side of the middle an incisure or cleft, which divides this part into three segments. The middle segment is slightly retracted and somewhat overlaps the lateral segments; it varies so in form, length and width, as to be almost characteristic of each species, and when taken in connection with characters afforded by the structure of the antennæ, determines the exact limits of each species. Without going into a minute description of the characters spoken of, I deem it preferable to illustrate them by the accompanying figures, which I hope will convey a more accurate idea than description could do and which will be referred to in the following pages.

Color is of no value whatever in distinguishing the species, and even sculpture, of such great value in the differentiation of species elsewhere, plays but a very subordinate part here. The hairy vesture, while fairly constant for each species, has only a relative value difficult of expression.

Although sought for assiduously, I have failed to discover any character positively indicating the sex. Generally speaking, the ♂♂ are more slender and more shining, the thoracic punctures and elytral asperities less pronounced and the latter sometimes replaced by punctures on the declivity.

After these preliminary remarks I offer the following analytical table for the identification of our species. It will be seen that *D.*

punctatus Lec. and *D. brevicornis* Lec. have been omitted, the first cannot be separated from *rufipennis* Kby., while the second is identical with *frontalis* Zimm. But one new species is added to the list.

I have omitted all references to bibliography and have simply confined myself to such remarks as will enable the student to realize the results aimed at in this paper.

Clava* subrhomboidal, third suture always distinct, remote from the apex. Enter joints of funicle more distinctly widened, figs. 1 and 2.

Scape of antennæ triangular, apical angles acute; second joint of funicle longer than the first, fig. 1. Median segment of epistoma short, broad, concave; shorter than the lateral ones; lateral edge oblique, ending anteriorly in a smooth tubercle, fig. 1 *a*. Hairs of moderate length.

terebrans.

Scape clavate, apex rounded; first and second joints of funicle of about equal length, fig. 2. Median segment of epistoma longer and narrower than in *terebrans*, scarcely concave, as long as the lateral segments, fig. 2 *a*. Rostrum more or less distinctly carinate. Hairs long.....**rufipennis.**

Clava transversely oval; first and second suture distinct, third subapical or indistinct; funicle with the outer joints less distinctly widened, scape clavate, figs. 3-6.

Median segment of epistoma narrow, extending slightly beyond the lateral segments; sides parallel, or nearly so, fig. 3 *a*. Club distinctly transversely oval, sutures curved, fig. 3.....**similis.**

Median segment rhomboidal, not extending beyond the lateral ones; sides oblique, figs. 4 *a* and 5 *a*.

Median segment less strongly narrowed anteriorly, as long as the lateral segments, not concave, fig. 4 *a*. Sutures of club straight, fig. 4. Front convex, not channeled. Thorax strongly narrowed anteriorly. Hairs conspicuous.....**simplex.**

Median segment strongly narrowed from the base, scarcely as long as the lateral ones and more or less concave, fig. 5 *a*. Sutures of club curved, figs. 5 and 6. Front channeled. Thorax feebly narrowed anteriorly, finely punctured.

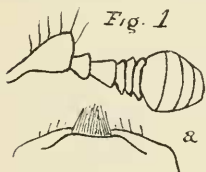
Larger; second joint of funicle longer than first, fig. 5. Hairs long, distinct.....**approximatus** n. sp.

Smaller; second joint of funicle not longer than first, fig. 6. Hairs inconspicuous.....**frontalis.**

* Normally, the club is simply compressed, not concave on its anterior face, as spoken of by Dr. LeConte in reference to several species. The concavity when existing is due to shrinkage; any reference to sutures, etc., applies only to the normal structures, as the shrinkage gives rise to irregularity.

D. terebrans Ol.

Very variable; what may be considered as typical specimens have the front strongly granulate-punctate; occiput densely and obviously punctured; thorax equally so, punctures coarser; median thoracic line entire, subcarinate; thorax at base strongly bisinuate; elytral punctures distinct, transverse, closely placed; interstices rough in their whole extent; color reddish brown. Length 5.2—8.5 mm.; .20—.34 inch.



Eastern States, California, Washington.

The following variations may be recognized:

a.—More coarsely punctured, shining; asperities of elytra forming more or less distinct, transverse rugæ, especially toward the base. Elytral puncture indistinct. Represented by a large pitchy black specimen from Maryland in Mr. Ulke's collection.

b.—Concavity of middle of epistoma somewhat extended upon the front, where it ends in a curved, but obscure ridge; generally more shining and less densely punctured. Punctures and asperities less pronounced. Smooth thoracic line more or less interrupted. Color as in the type, rarely darker. The bisinuation at base of thorax is less strong.

Washington, California, Colorado, Arizona, Idaho.

c.—Front with a central impression; occiput convex, very finely punctured. Thorax more finely punctured, basal bisinuation feeble, elytral punctures sharply defined, asperities less so.

New Mexico, Nevada, Arizona, California.

d.—Front convex, feebly roughened; occiput very finely and remotely punctulate. Base of thorax scarcely bisinuate; in fact, viewed from above, it appears strongly emarginate. Elytral punctures smaller and much less evident than in the preceding variety. Three specimens, a little below average size, were taken by me in Schuylkill County some years ago.

The characters given in the table make the identification of this species at once easy and certain.

D. rufipennis Kirby.

The most variable species. The simply clavate scape and form

of epistoma distinguish it from *terebrans*, with which it agrees in the formation of the club, which at the same time distinguishes this species from all the following. The rostral carina is strongly developed in some specimens, entirely obsolete in others. The thoracic punctures vary greatly in size and density in different specimens, and are always of varying size in

the same. The smooth thoracic line varies from being scarcely noticeable to a strong carina. The asperities of the elytra are feebly developed or else entirely replaced by punctures on the declivity. In the latter case the striae are very feebly impressed and the surface more shining (♂♂). Length 5—7.5 mm.; .20--.30 inch.

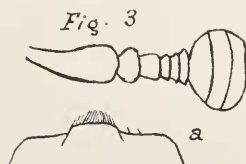
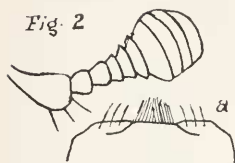
Specimens are before me from Alaska, Canada, New Brunswick, Colorado, Utah, Florida (Pennsylvania *D. punctatus*).

I am unable to separate *D. punctatus* Lec. from the present species. A specimen in Dr. Horn's collection is conspicuously clothed with long grayish white hair, the color in all other specimens before me being yellow.

Very closely related to the present is the European species *D. micans* Kug., with which it agrees in the formation of epistoma and antennæ, except that in the latter the second joint of funicle is longer than the first. Save for the latter character, specimens in my collection could not be distinguished from several specimens from Sitkha in Mr. Ulke's collection. In my specimens, however, the front is strongly punctured, not granulate, and the thoracic punctures generally coarser than in any specimen of *rufipes* before me. I add these characters as it is not unlikely that *D. micans* may yet be found within our faunal limits, and thereby enable it to become recognized.

D. similis Lec.

Readily distinguished by the formation of the epistoma. The median segment projects slightly beyond the lateral segments, the sides are straight or nearly so, and continued to the front; the surface is more or less convex and roughened. The lateral spaces are concave; the club is transverse, and in the majority of specimens before me, appears slightly emarginate at tip. The head has two median longitudinal impressions, often connected by an impressed line.



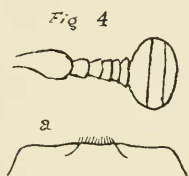
Thorax densely and finely punctured and strongly narrowed anteriorly. Elytral declivity roughened. Hairs long. Length 6 mm.; .24 inch.

Oregon, California, Colorado, Canada.

Two specimens in my collection from Sylvania, Cala., have the elytral declivity very slightly asperate and the hairs much shorter.

D. simplex Lec.

Resembles the last species in general form and also somewhat in the formation of the epistoma. The median segment, however, never extends beyond the lateral segments and the sides are always oblique; the surface is rather convex and roughened. Head convex, with one or two longitudinal impressions. Sutures of club transverse. Thorax rather coarsely punctured. Length 5.0—6.2 mm.; .20—.25 mm.

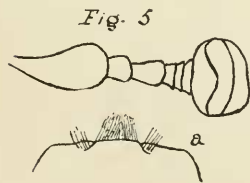


Michigan, Colorado, Lake Superior, California.

Seven specimens before me present scarcely any variation. This species is readily distinguished from the preceding ones by its much smaller size and from the two following by its strongly narrowed thorax.

D. approximatus n. sp.

Elongate cylindrical, rather shining and thinly clothed with moderately long, yellow hairs. Head broad; front coarsely granulate, channeled. Antennæ, second joint of funicle longer than the first; club large, sutures curved; middle segment of epistoma shorter than the lateral segments, sides strongly oblique; surface concave. Thorax about one-half wider than long, slightly narrowed anteriorly; shining, punctures moderate, not closely



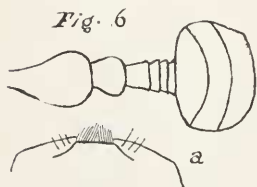
placed. smooth median line indistinct; a strong transverse impression about one-fourth from the anterior margin; base strongly bisinuate. Elytral striæ moderately impressed. punctures confused, interstices asperate. Hairs more conspicuous on the declivity. Length 5—6 mm.; .20—.24 inch.

Four specimens, two ♂♂ and two ♀♀ from New Mexico and Colorado in Dr. Horn's collection are before me. But for its large

size, this species might readily be taken for *frontalis*, with which it agrees in the large head, form of epistoma and structure of antennal club, but easily distinguished by the greater length of second joint of funicle and greater length and more conspicuous hairs. The thoracic punctures are also a trifle coarser than in that species.

D. frontalis Zimm., **D. brevicornis** Lec., Proc. Amer. Philos. Soc. xv, 386.

After careful examination of typical specimens of each, no doubt of their identity is left in my mind. The structure of the epistoma and the antennæ is alike. In some ♂♂ the very short hairs on the elytra are intermixed with a few, scattered, longer ones. With the exception of two specimens from New Mexico and



California the front is channelled in all; the frontal tubercles are variable in development. The sutures of the club are curved. Length 2.75—4.0 mm.; .11—.16 inch.

California, Arizona, Maryland.

Easily recognized by its small size. The resemblance to *approximatus* has been referred to under that species.

In conclusion I desire to call the attention of collectors to the necessity of collecting observations and data in the life-history of the Scolytidæ. Especially as to the time of their appearance, and to the collecting of specimens of bark demonstrating the larval passages from the time the larva leaves the ovum until it reaches the pupal stage. The necessity of this will be evident to all who contemplate the future of our North American forests.